

ies do help to expand the mind and enlarge the horizon, beyond all which exact science alone can do; and those colleges will best accomplish their purposes of usefulness, which make more of the sciences than of the arts, more of principles than of their applications; and which offer to their pupils, in addition to the studies and exercises which will make them exact and strong, those studies and exercises help to render them, at the same time, broad and fine. I do not doubt that much, of what is at present rightly complained of, is due merely to the haste with which this great system of schools has been built up, and to the fact that the philosophy of technological education so largely remains to be developed.

The technical applications of science, if properly set before the student, and duly subordinated to the principles of science, will not detract from disinterestedness of study; while they will add greatly to the zeal and earnestness with which the work of the college will be done. It is here I would take issue, most directly, with those who assert for the old-fashioned college an educational virtue superior to that of the schools we represent. It is of the very essence of our case, that the directness and immediateness of application to which the studies of our students are subject, constitutes a tremendous educational force, securing closeness and continuity of attention, earnestness of effort, zeal, and enthusiasm for work. And, be it remembered, zeal and enthusiasm are not to be valued merely because, or merely as, they secure directness of attention, continuity of application and sustained endeavor. In themselves, of themselves, by themselves, they are in a high sense an educational force, telling immediately, and telling powerfully upon intellect and character contributing to build up mental and moral substance firmly and healthy.

It is a fact too palpable to be questioned that the large and undoubted advantages of the traditional system of education are secured by those students whose aptitudes and tastes gives them an interest in the pursuit of language and literature,

at a great, often an unspeakable sacrifice, on the part of that other, and not inconsiderable, class of young men whose faculties and dispositions do not prepare them for or incite them to studies of this character. It is a familiar feature of classical colleges that large numbers of students who are by nature neither vicious nor idle, not finding the wants of their minds satisfied by the studies to which they are directed, relinquish all scholarly ambition, and come to accept the part of doing nothing well, contented to be known as poor scholars, frequently rebuked and harassed by their instructors and their parents on account of their deficiencies, and, at the most, aiming no higher than barely to pass the periodical examinations. Surely, this is a poor preparation for life!

It is making no unseemly boast, and offering no unfair comparison, to say that pupils of that class are exceedingly rare in scientific and technical schools. The idle student is not unknown even there; but he makes no such figure in the life of the school. Differences, great differences, of course, exist as to the degree of success attained by different scholars, yet it is truly inspiring to observe how far the opportunity to make choice of the studies which shall be undertaken and the universal introduction of experimental work, go to make up for the deficiencies which appear when a large body of students are subjected to one and the same test of scholarly ability and performance. Young men who exhibit no inclination or aptitude for linguistic or philosophical studies, are often found to take the deepest interest in natural history, in chemistry or in mechanics; to have truly remarkable aptitudes for manipulation and ingenuity in the treatment of difficulties; and to possess excellent powers of perception, discrimination and judgment. Not infrequently, one who, if compelled to pass through long courses of classical, rhetorical, and dialectical exercises, would have had a thoroughly unhappy career, finding nothing in his daily tasks to interest his mind and to call out his powers, feeling himself continually at a disadvantage in comparison with others, and